Amendments to the Drawings:

The attached sheets of drawings include two new sheets of drawings: Fig.'s 29 and 30.

Attachment: Two New Sheets representing Fig's 29 and 30.

REMARKS/ARGUMENTS

The Office Action of September 28, 2006 has been carefully reviewed and these remarks are responsive thereto.

On December 22, 2006, Applicants submitted a timely Amendment in response to the Office Action. This amendment was not entered, and a Notice of Non-Compliant Amendment issued January 11, 2006 due to Applicants' failure to indicate that claims 1-41 had been cancelled. Applicants herein have renumbered claims 42-75 presented in the December 22, 2006 Amendment as claims 1-34, correcting the dependency of the claims as appropriate. No other amendments to the claims have been made in this Amendment.

By way of convention and for the convenience of the Examiner, applicants will refer to the new claim numbers 1-34, with to the prior claim numbers set forth in parentheses. For example, claim 42, which has been renumbered as claim 1, will be referred to as "claim 1(42)." Following this convention, claims 1(42), 7(48), 15(56), 19(60), 24(65) and 26(67) have been amended; no claims have been canceled. Claim 32(73) has been added to recite the step of creating a tree-structured index for a database in a computer as introduced at page 4, ll. 4-18. Claim 33(74) has been added to recite the step of "defining a partition of data records of the database using entropy/adjacency partition assignment" as supported, for example, at page 5, ll. 14-16. Claim 34(75) has been added to recite "both data clustering and entropy-adjacency partitioning being used in the same tree of nodes" as supported, for example, at p. 19, ll. 7-13. Claims 1-34(42-75) are thus pending in this application. Reconsideration and allowance of the instant application are respectfully requested.

Typographical errors have been discovered and corrected in the specification at page 36, lines 3-4 where the Boolean expression did not match with cluster number 1 of Table 3. The expression for cluster number 1 reads yes, no, no, yes, but the specification improperly identified the final no, yes for the loci of allele's 11 and 12 with incorrect identifications of the loci. These loci should read D16s539 as per Table 3, cluster 1.

Drawings

The drawings are objected to under Rule 83(a) for failure to show every feature of the invention specified in the claims, in particular, the method claims and respective steps. This

objection is traversed in part and two new sheets of drawings are submitted herewith representing Fig.'s 29 and 30 which should overcome the rejection. The objection is traversed in part because there are already 28 figures of drawings showing the various steps in detail. Consequently, it is not understood why the Examiner is requiring the method steps be shown. By way of example, Figures 2, 4, 5, 7, 8, 9 . . . and the like show partitioning. Figures 1 and 29 and so on show clustering. For example, Figure 21 shows clusters using principal component analysis (PCA); also, see Figures 22 and 25.

To satisfy the Examiner's concern, two new sheets of drawings have been prepared. New Figure 29, for example, generically shows the method steps recited in independent claims 1(42) and 56. Figure 30 generically shows the method steps recited in independent claim 24(65).

It is respectfully submitted that each method step need not be shown as further recited in dependent claims. For example, claim 2(43) and 25(66) further define the partitioning step as partitioning into groups of approximately equal size, for example, as described in the specification at page 3, ll. 27-28. Claims 3(44) and 16(57) recite in pertinent part the concept of selecting a partition from many computed solutions as described, for example, in the discussion in the specification of Example 2. Cluttering the drawings with substep/related steps in the case of the partitioning/selecting steps would not appear to be necessary to an understanding of the claimed invention. Indeed, these substep/related steps may be properly discussed in the context of the partitioning step 2920 of Figure 29. Figures 29 and 30 are now referred to at appropriate locations via amendments to the specification. These amendments for reference purposes do not add prohibited new matter.

Objections Under 35 U.S.C. § 112

Claim 24(65) has been amended to overcome a typographical mistake that the Examiner has found and to comply with antecedent basis issues. In particular, claim 24(65) has been amended to read: "A method of partitioning data records of a database in a computer . . ." This amendment is believed to overcome the objection of the Examiner's paragraph 5. and the rejection re "the data records" of the Examiner's paragraph 7, each with respect to claim 24(65). Also, claim 24(65), line 4 has been amended to be more definite and to recite: "the root node *is* a non-terminal node or a leaf node," replacing "may be."

Rejections Under 35 U.S.C. § 112, first paragraph

Claim 14(55) stands rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the Examiner could find no description of "the value of the function is minimized." This rejection is respectfully traversed as there exists considerable support for the recitation in the specification. The Examiner is referred, first, to the paragraph beginning at p. 3, l. 27 and continuing to p. 4, l. 3 introducing an embodiment in which "the value of the function is minimized." Furthermore, in the discussion of EXAMPLE 2, beginning at p. 16, l. 5, there is continued further support in relation to a definition of a function defined at p. 18, l. 7, in which optimization is discussed in the context of minimizing cost due to a "combination of measures" as recited, for example, in the context of entropy and adjacency. See p. 16, ll. 23-24, "minimizes entropy," ll. 28-29, "minimum entropy," p. 17, l. 1, "minimum entropy," p. 17, l. 11, "cost decreases", p. 18, l. 5, "the combined cost is minimized," and so on. These are provided by way of example only and are not intended to be limiting the locations of support to only these. However, it should be clear from a reading of the specification that the recitation is supported and, consequently, the rejection should be reversed in a forthcoming Office Action.

Rejections under 35 USC § 112, second paragraph

The Examiner has rejected claims 1(42), 7(48), 14(55), 15(56), 19(60) and 24(65) under 35 U.S.C. 112, second paragraph, as being indefinite. Applicants have amended the claims to present the claims in a more preferred form, and respectfully request the rejection be withdrawn. As indicated above, the rejection of claim 14(55) is respectfully traversed on the grounds that the specification amply supports the claim.

Rejections Under 35 U.S.C. § 102

Claims 1-11(42-52), 13-22(54-63) and 24-30(65-71) stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,128,587, hereinafter Sjolander. Applicants respectfully traverse this rejection for at least the following reasons. In order to reject a claim as anticipated under 35 U.S.C. §102, a single prior art reference must teach every aspect of the claimed invention. MPEP § 706.02. The Examiner in paragraph 8 reads "combination of measures" of

claim 1(42) on Sjolander's "entropy measure" and refers Applicants to col. 8, ll. 5-35. Similarly, in rejecting claim 15(56), the Examiner reads "combination of measures of entropy and adjacency" on the same passage at col. 8, ll. 5-35. However, it is clear from a reading of the passage that Sjolander only refers to entropy. The term "adjacency" is nowhere found in Sjolander. Sjolander (at col. 8, ll. 15-24) admittedly defines "relative entropy (also known as Kullback Leibler distance) . . ." but this distance and relative entropy are the same and are not "adjacency" as recited. Consequently, Sjolander does not teach a "combination of measures" as recited, only one measure, entropy.

Sjolander uses relative entropy to choose which pairs of sequences (i.e. data items) to combine and to reduce the size of partition from the bottom (N partition items for N sequences) up (one partition element containing all sequences). Sjolander does not combine relative entropy with anything else. She uses relative entropy to successively reduce the size of the partition.

Sjolander, since she does not teach "adjacency," cannot teach or suggest a "function of values of a designated variable associated with the data records, wherein the function comprises a combination of measures" for the reason that Sjolander only teaches one measure, entropy.

Consequently, this rejection is respectfully traversed. Claim 7(48) has been amended to further recite: "one of the measures being weighted by a weighting factor." It is respectfully submitted that Sjolander fails to teach a "combination of measures, one of the measures being weighted by a weighting factor." Independent claim 15(56) has been amended to further recite: "adjacency being weighted by a weighting factor." These amendments further patentably distinguish claims 7(48) and 15(56) over Sjolander.

Claim 24(65) relates to a clustering algorithm involving a test. The test has been amended to "query" as supported at page 5, lines 12-17: "A test result is output in response to a query that evaluates either a Boolean expression or a decision tree." Example 3 at page 19 describes the implementation of a decision tree in software. Also, page 36, lines 5-26 define the Boolean expression and decision tree analysis in respective paragraphs. Consequently, claim 24(65) has been amended to now define a "query that evaluates one of a Boolean expression or a decision tree", nowhere taught by Sjolander. The Boolean expression test is supported, for example, at p. 36, ll. 5-17 and the decision tree at p. 36, lines 18-26. Sjolander works from the bottom up. There is no Boolean test or decision tree disclosed or suggested by Sjolander. A careful reading of claim 24(65) will indicate that the expression "each non-terminal node is connected to ***two or more branches***

originating at the non-terminal node and terminating at a node," is also not disclosed or suggested by Sjolander. Instead, Sjolander uses only binary phylogenetic trees. Moreover, a claim must be read together with all its elements. Sjolander fails to teach step (a) i.e. "identifying naturally occurring sets of clusters in the data records of the database" in combination with step (c) which refers specifically to a set of clusters identified in step (a). In summary, nowhere does Sjolander teach or suggest any query of an identified set of clusters that evaluates a Boolean expression or decision tree as recited, nor does Sjolander teach or suggest anything other than a binary phylogenetic tree.

Claim 26(67), dependent on claim 24(65) has been amended to recite "said queries are determined by a combination of entropy and adjacency" as supported at page 5, ll. 12-17 and at page 19, lines 7-13 re forming the decision tree in software.

Rejections Under 35 U.S.C. § 103

Claims 12(53), 23(64) and 31(72) stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. No. 6,128,587, hereinafter Sjolander.

In order to establish a *prima facie* case of obviousness under § 103(a), three criteria must exist: 1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings; 2) there must be a reasonable expectation of success; and 3) the prior art reference(s) must teach or suggest all the claim limitations. *See* MPEP § 706.02 (j); *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

However, the prior art did not discover or appreciate the problem that is solved by the invention, i.e. the development of a function that involves a combination of measures, and not a single measure as applied to the independent claims, let alone to the applied field of space science. Since Sjolander does not teach "a combination of measures, one of the measures being weighted by a weighting factor," she cannot render obvious either independent claim 1(42) or 15(56). Thus, there cannot be any expectation of success or any reason to modify or combine the references when one does not know that some modification or combination will solve a problem that the individual does not know even exists. Moreover, Sjolander fails to teach a Boolean expression or decision tree query as now recited in independent claim 24(65) as amended.

Claims 1-34(42-75) are allowable for all the reasons given above concerning their respective base claims, and further in view of their specific recitations that have not been shown to be in (or obvious from) the prior art. In the event the rejections are maintained, the examiner is requested to cite supporting evidence, as required by MPEP § 2144.03.

CONCLUSION

All rejections having been addressed, applicant respectfully submits that the instant application is in condition for allowance, and respectfully solicits prompt notification of the same. However, if for any reason the Examiner believes the application is not in condition for allowance or there are any questions, the Examiner is requested to contact the undersigned at (202) 624-7325.

Respectfully submitted,

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Dated this 9th day of February, 2007

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